

REMARKS

Claim Rejections 35 U.S.C. § 112, second paragraph

The Examiner has rejected claim 28 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Applicants have amended claim 28. Support is provided at lines 5-7 on page 14 of the specification. Claim 28 is dependent upon claim 27. Claim 27 is dependent upon claim 25.

Claim 28 claims the apparatus of claim 27 wherein the electron scanning delivery system provides a highly focused electron beam that is smaller than 30 % of a size of the opaque defect.

Thus, Applicants particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

In view of the foregoing, Applicants respectfully request the Examiner to withdraw the rejections to claim 28 under 35 U.S.C. § 112, second paragraph.

Claim Rejections 35 U.S.C. § 103 (a)

Claims 1, 4-12, 18, 20, 25, and 27-31

The Examiner has rejected claims 1, 4-12, 18, 20, 25, and 27-31 under 35 U.S.C. §103 (a) as being unpatentable over Casey, Jr. et al. (US 6,042,738) as demonstrated by Baum, Aaron Wolf et al. (US 5,684,360 A) in view of Parker et al. (US 4,818,872 A).

Applicants respectfully disagree with the Examiner. Applicants have amended claim 1, 25, 28, and 31. Support is provided at lines 23-28 on page 13 and lines 1-8 on page 14 of the specification.

Claim 1, as amended, of Applicants' claimed invention, claims an apparatus (400) lacking an ion column and including: a holder (420) to mount a substrate (410); a stage (430) to position the holder in a chamber (470); an imaging system (440) to locate an opaque defect (405) on the substrate, the imaging system located vertically above the substrate, the imaging system including a first electron column, the first electron column to direct a first set of electrons towards the opaque defect; a gas delivery system (450) to dispense a reactant gas towards the opaque defect; and an electron scanning delivery system (460) to induce chemical etching of the opaque defect by the reactant gas without damaging underlying layers, the electron scanning delivery system including a second electron column, the second electron column to direct a second set of electrons towards the opaque defect. See Figure 4. Also, see pages 12-14 of the specification.

Claim 25, as amended, of Applicants' claimed invention, claims an apparatus (400) lacking an ion column and including: a chamber (470); a stage (430) located in the chamber, the stage to move in different directions; a holder (420) positioned in the chamber by the stage; a mask (410) mounted on the holder; an opaque defect

(405) located on the mask; an imaging system (440) for the chamber, the imaging system located directly above the opaque defect, the imaging system to locate the opaque defect; a gas delivery system (450) for the chamber; a gas dispensed by the gas delivery system towards the opaque defect; an electron scanning delivery system (460) for the chamber; electrons directed by the electron scanning delivery system towards the opaque defect, the electrons to induce the gas to etch the opaque defect without damaging underlying layers; and a pumping system to evacuate volatile byproducts of the etch. See Figure 4. Also, see pages 12-14 of the specification.

Claim 31, as amended, of Applicants' claimed invention, claims an apparatus (400) lacking an ion column and including: a chamber (470), the chamber to hold a mask (410); an imaging system (440) for the chamber, the imaging system located directly over the mask, the imaging system to locate an opaque defect (405) on the mask; a gas delivery system (450) for the chamber, the gas delivery system to dispense one or more gases towards the opaque defect; and an electron scanning delivery system (460) for the chamber, the electron scanning delivery system to direct electrons towards the opaque defect, the electrons to induce chemical etching of the opaque defect by the one or more gases without damaging underlying layers. See Figure 1. Also, see Col. 4, lines 28-34.

Thus, a combination of the apparatus of Casey, Jr. et al., the apparatus of Baum, Aaron Wolf et al., the apparatus of Parker et al., even if possible, would still not produce the apparatus as claimed in claim 1, or claim 25, or claim 31, of Applicants' claimed invention since none of the three references cited by the Examiner teaches an apparatus lacking an ion column and including an electron scanning delivery system to induce chemical etching of an opaque defect.

Consequently, Applicants' claimed invention, as claimed in claims 1, 25, or 31, would not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

Claims 4-12, 18, and 20 are dependent on claim 1.

Claims 27-30 are dependent on claim 25.

Thus, a combination of the apparatus of Casey, Jr. et al., the apparatus of Baum, Aaron Wolf et al., the apparatus of Parker et al., even if possible, would also still not produce the apparatus as claimed in claims 4-12, 18, 20, and 27-30 4-12, 18, 20, and 27-30 of Applicants' claimed invention since none of the three references cited by the Examiner teaches an apparatus lacking an ion column and including an electron scanning delivery system to induce chemical etching of an opaque defect.

Consequently, Applicants' claimed invention, as claimed in claims 4-12, 18, 20, and 27-30 would also not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

In view of the foregoing, Applicants respectfully request the Examiner to withdraw the rejections to claims 1, 4-12, 18, 20, 25, and 27-31 under 35 U.S.C. §103 (a).

Claim 19

The Examiner has rejected claim 19 under 35 U.S.C. §103 (a) as being unpatentable over Casey, Jr. et al. (US 6,042,738) as demonstrated by Baum, Aaron Wolf et al. (US 5,684,360 A) in view of Parker et al. (US 4,818,872 A) and Fuji, Eiji et al. (US 5,876,504 A).

Applicants respectfully disagree with the Examiner. Claim 19 is dependent on claim 1. Applicants have amended claim 1. Support is provided at lines 23-28 on page 13 and lines 1-8 on page 14 of the specification.

Claim 1, as amended, of Applicants' claimed invention, claims an apparatus (400) lacking an ion column and including: a holder (420) to mount a substrate (410); a stage (430) to position the holder in a chamber (470); an imaging system (440) to locate an opaque defect (405) on the substrate, the imaging system located vertically

above the substrate, the imaging system including a first electron column, the first electron column to direct a first set of electrons towards the opaque defect; a gas delivery system (450) to dispense a reactant gas towards the opaque defect; and an electron scanning delivery system (460) to induce chemical etching of the opaque defect by the reactant gas without damaging underlying layers, the electron scanning delivery system including a second electron column, the second electron column to direct a second set of electrons towards the opaque defect. See Figure 4. Also, see pages 12-14 of the specification.

Thus, a combination of the apparatus of Casey, Jr. et al., the apparatus of Baum, Aaron Wolf et al., the apparatus of Parker et al., and the apparatus of Fuji, Eiji et al.; even if possible, would still not produce the apparatus as claimed in claim 1 of Applicants' claimed invention since none of the four references cited by the Examiner teaches an apparatus lacking an ion column and including an electron scanning delivery system to induce chemical etching of an opaque defect.

Consequently, Applicants' claimed invention, as claimed in claim 1, would not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

Claim 19 is dependent on claim 1.

Thus, a combination of the apparatus of Casey, Jr. et al., the apparatus of Baum, Aaron Wolf et al., the apparatus of Parker et al., and the apparatus of Fuji, Eiji et al.; even if possible, would still not produce the apparatus as claimed in claim 19 of Applicants' claimed invention since none of the four references cited by the Examiner teaches an apparatus lacking an ion column and including an electron scanning delivery system to induce chemical etching of an opaque defect.

Consequently, Applicants' claimed invention, as claimed in claim 19, would not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

In view of the foregoing, Applicants respectfully request the Examiner to withdraw the rejections to claim 19 under 35 U.S.C. §103 (a).

Claims 21-24, 26, 32, and 33

The Examiner has rejected claims 21-24, 26, 32, and 33 under 35 U.S.C. §103 (a) as being unpatentable over Casey, Jr. et al. (US 6,042,738) as demonstrated by Baum, Aaron Wolf et al. (US 5,684,360 A) in view of Parker et al. (US 4,818,872 A).

Applicants respectfully disagree with the Examiner. Claims 21-24 are dependent on claim 1. Claim 26 is dependent on claim 25. Claims 32-33 are dependent on claim 31. Applicants have amended claims 1, 25, 31, and 32.

Claim 1, as amended, of Applicants' claimed invention, claims an apparatus (400) lacking an ion column and including: a holder (420) to mount a substrate (410); a stage (430) to position the holder in a chamber (470); an imaging system (440) to locate an opaque defect (405) on the substrate, the imaging system located vertically above the substrate, the imaging system including a first electron column, the first electron column to direct a first set of electrons towards the opaque defect; a gas delivery system (450) to dispense a reactant gas towards the opaque defect; and an electron scanning delivery system (460) to induce chemical etching of the opaque defect by the reactant gas without damaging underlying layers, the electron scanning delivery system including a second electron column, the second electron column to direct a second set of electrons towards the opaque defect. See Figure 4. Also, see pages 12-14 of the specification.

Claim 25, as amended, of Applicants' claimed invention, claims an apparatus (400) lacking an ion column and including: a chamber (470); a stage (430) located in the chamber, the stage to move in different directions; a holder (420) positioned in the chamber by the stage; a mask (410) mounted on the holder; an opaque defect (405) located on the mask; an imaging system (440) for the chamber, the imaging system located directly above the opaque defect, the imaging system to locate the

opaque defect; a gas delivery system (450) for the chamber; a gas dispensed by the gas delivery system towards the opaque defect; an electron scanning delivery system (460) for the chamber; electrons directed by the electron scanning delivery system towards the opaque defect, the electrons to induce the gas to etch the opaque defect without damaging underlying layers; and a pumping system to evacuate volatile byproducts of the etch. See Figure 4. Also, see pages 12-14 of the specification.

Claim 31, as amended, of Applicants' claimed invention, claims an apparatus (400) lacking an ion column and including: a chamber (470), the chamber to hold a mask (410); an imaging system (440) for the chamber, the imaging system located directly over the mask, the imaging system to locate an opaque defect (405) on the mask; a gas delivery system (450) for the chamber, the gas delivery system to dispense one or more gases towards the opaque defect; and an electron scanning delivery system (460) for the chamber, the electron scanning delivery system to direct electrons towards the opaque defect, the electrons to induce chemical etching of the opaque defect by the one or more gases without damaging underlying layers. See Figure 1. Also, see Col. 4, lines 28-34.

Thus, a combination of the apparatus of Casey, Jr. et al., the apparatus of Baum et al., and the apparatus of Parker et al., even if possible, would still not produce the apparatus as claimed in claim 1, or claim 25, or claim 31 of Applicants' claimed invention since none of the three references cited by the Examiner teaches an apparatus lacking an ion column and including an electron scanning delivery system to induce chemical etching of an opaque defect.

Consequently, Applicants' claimed invention, as claimed in claim 1, claim 25, or claim 31, would not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

Claims 21-24 are dependent on claim 1. Claim 26 is dependent on claim 25. Claims 32-33 are dependent on claim 31.

Thus, a combination of the apparatus of Casey, Jr. et al., the apparatus of Baum, Aaron Wolf et al., and the apparatus of Parker et al., even if possible, would also still not produce the apparatus as claimed in claims 21-24, 26, and 32-33 of Applicants' claimed invention since none of the three references cited by the Examiner teaches an apparatus lacking an ion column and including an electron scanning delivery system to induce chemical etching of an opaque defect.

Consequently, Applicants claimed invention, as claimed in claims 21-24, 26, and 32-33 would also not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

In view of the foregoing, Applicants respectfully request the Examiner to withdraw the rejections to claims 21-24, 26, and 32-33 under 35 U.S.C. §103 (a).

Conclusion

Applicants believe that all claims pending, including claims 1, 4-12, and 18-33, are now in condition for allowance so such action is earnestly solicited at the earliest possible date.

Pursuant to 37 C.F.R. 1.136 (a) (3), Applicant hereby requests and authorizes the U.S. Patent and Trademark Office to treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time.

Should there be any additional charge or fee, including a Request for Continued Examination, an extension of time fee, or other fees under 37 C.F.R. 1.16 and 1.17, please charge Deposit Account No. 50-0221.

If a telephone interview would in any way expedite the prosecution of this application, the Examiner is invited to contact the undersigned at (408) 720-8300.

Respectfully submitted,
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